Title: FMD Medicine Safety Features – Article 23 Flexibilities **IA No:** **RPC Reference No:** **Lead department or agency:** MHRA **Other departments or agencies:** Department of Health and Social Care	Impact Assessment (IA) **Date:** 02/02/2018 **Stage:** Consultation **Source of intervention:** Domestic EU **Type of measure:** Other **Contact for enquiries:** FMD.safetyfeatures@mhra.gov.uk
Summary: Intervention and Options	**RPC Opinion:** Awaiting Scrutiny

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANDCB in 2014 prices)	**One-In, Three-Out**	**Business Impact Target Status**
£-25.7m	£-25.7m	£1.3m	Not in scope	Non qualifying provision

What is the problem under consideration? Why is government intervention necessary?

Falsified medicines present a threat to public health in the form of adverse reactions, dangerous ingredients, interaction with other medicines, no improvement in health condition, disincentive to take prescribed medicines and loss of faith in healthcare systems. At present there is no mechanism that allows users to verify where a medicine comes from. The EU Falsified Medicines Directive (FMD) seeks to prevent falsified medicines from entering the legitimate supply chain and reaching patients. This impact assessment considers the Article 23 flexibility within the 'safety features' policy of the FMD. In addition to the Article 23 flexibility, there are a number of other flexibilities within the regulation that have not been assessed because our overall approach is not to go beyond the minimum requirements of the Regulation. The 'safety features' policy requires a unique identifier and tamper-evident features to be added to prescription medicine packs. Taking the direct ten-year cost of the preferred option, this means each falsified medicine item prevented would need to have caused the loss of 0.1 QALYs for this policy to break even.

What are the policy objectives and the intended effects?

To prevent harm to people in the UK from falsified medicines.

To reduce the occurrence of falsified medicines in the legitimate supply chain.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Option Zero: Do nothing
Option One: Require wholesalers to decommission on behalf of Article 23 providers; OR
Option Two: Require certain Article 23 providers to decommission themselves.

Option One is the preferred option, as it represents the best value for money of the options available to the UK.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 2024

Does implementation go beyond minimum EU requirements?		No		
Are any of these organisations in scope?	**Micro** Yes	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:** na	**Non-traded:** na	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: ..... ***Date*** .....

Summary: Analysis & Evidence Policy Option 1

Description: One: Require wholesalers to decommission for Article 23 providers

FULL ECONOMIC ASSESSMENT

Price Base Year 2016	PV Base Year 2019	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -20.1	**High: -31.9**	**Best Estimate:--25.7**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Cost (Present Value)
Low	12.4	1	0.8	**20.1**
High	12.8		1.9	**31.9**
Best Estimate	12.6		1.3	**25.7**

Description and scale of key monetised costs by 'main affected groups'

Wholesalers will be required to decommission and check the anti-tampering devices on behalf of Article 23 healthcare providers such as dentists and optometrists. Labour will be required for checking the anti-tamper device and scanning.

Other key non-monetised costs by 'main affected groups'

All costs have been monetised.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)
Low	na		na	**na**
High	na		na	**na**
Best Estimate	na		na	**na**

Description and scale of key monetised benefits by 'main affected groups'

Each falsified medicine item prevented would need to have caused the loss of 0.1 QALYs for this policy to break even. If the policy only prevented half of the falsified medicines from getting through, then each medicine would need to prevent the loss of 0.2 QALYs. We do not have the evidence to demonstrate whether this level of QALY loss will be prevented.

Other key non-monetised benefits by 'main affected groups'

The legitimate supply chain will be better protected from falsified medicines, providing businesses in the supply chain with assurance that the products they are selling are genuine, and reducing the risk of harm to the health of those in the UK using medicines. The verification system will also aid recall using the unique identifier/batch number. and this will reduce the resource required for recalls.

Key assumptions/sensitivities/risks **Discount rate (%)** 1.5/3.5

A 1.5 % discount rate has been used for NHS impacts, and a 3.5% rate has been used for all other impacts. Many of the systems and pieces of equipment required to implement the policy are still being designed at the time of assessment, therefore the figures are illustrative, and are based on best estimates from industry. We welcome further evidence on the costs and benefits of this policy at consultation.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 3	**Benefits: 0**	**Net: -3**	non-qualifying

Summary: Analysis & Evidence Policy Option 2

Description: Two: Require Article 23 providers to decommission themselves.

FULL ECONOMIC ASSESSMENT

Price Base Year 2016	**PV Base Year** 2019	**Time Period Years** 10	**Net Benefit (Present Value (PV)) (£m)**		
			Low: -370.9	**High:** --578.0	**Best Estimate:** -473.2

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant	**Total Cost** (Present Value)
Low	5.5	1	36.5	370.9
High	20.4		55.5	578.0
Best Estimate	11.7		46.0	473.2

Description and scale of key monetised costs by 'main affected groups'

All operators in the medicines supply chain, including healthcare providers such as dentists and optometrists, will be required to purchase equipment to commission, verify or decommission the unique identifier on prescription medicine packets. Labour will be required for checking the anti-tamper device and scanning. Market Authorisation holders will be required to pay for a data repository system. Some businesses will be required to upgrade their internet connection.

Other key non-monetised costs by 'main affected groups'

All costs have been monetised.

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant	**Total Benefit** (Present Value)
Low	na		na	**na**
High	na		na	**na**
Best Estimate	na		na	**na**

Description and scale of key monetised benefits by 'main affected groups'

Each falsified medicine item prevented would need to have caused the loss of 1.87 QALYs for this policy to break even. If the policy only prevented half of the falsified medicines from getting through, then each medicine would need to prevent the loss of 3.74 QALYs. We do not have the evidence to demonstrate whether this level of QALY loss will be prevented.

Other key non-monetised benefits by 'main affected groups'

The legitimate supply chain will be better protected from falsified medicines, providing businesses in the supply chain with assurance that the products they are selling are genuine, and reducing the risk of harm to the health of those in the UK using medicines. The verification system will also aid recall using the unique identifier/batch numberand this will reduce the resource required for recalls.

Key assumptions/sensitivities/risks **Discount rate (%)** 1.5/3.5

A 1.5 % discount rate has been used for NHS impacts, and a 3.5% rate has been used for all other impacts. Many of the systems and pieces of equipment required to implement the policy are still being designed at the time of assessment, therefore the figures are illustrative, and are based on best estimates from industry. We welcome further evidence on the costs and benefits of this policy at consultation.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			**Score for Business Impact Target (qualifying provisions only) £m:**
Costs: 49.0	**Benefits: 0**	**Net:** -49.0	49.0

Background

1. The EU Falsified Medicines Directive (FMD) (2011/62/EU) was adopted in 2011 and introduced new harmonised measures to ensure that medicines in the EU are safe, and that trade in medicines is properly controlled.
2. Elements of the Directive, including a common logo to identify legal online pharmacies, and tougher rules on the control and inspection of producers of active pharmaceutical ingredients have already been implemented.
3. Member States have until February 2019 to implement the final part of the Directive, the 'safety features' regulation. The Commission published the adopted Delegated Regulation on the safety features policy (EU 2016/161) on 9 February 2016 following scrutiny by the European Parliament and Council. This provides more detail on how the measures set out initially in the Directive should be implemented.
4. The Delegated Regulation provides the detail of an end-to-end verification system where medicinal products bearing the safety features can be identified and authenticated.

UK proposed approach to implementation

5. The UK submitted the notification of its intention to withdraw from the Union pursuant to Article 50 of the Treaty on European Union on 29 March 2017. However, the Government recognises the importance of a close cooperative relationship between the UK and the EU in the field of medicines regulation, and science and research collaboration. The Government is committed to ensuring a positive outcome for the sector that enhances competitiveness and builds on the success that we are rightly proud of, as we exit the EU. The Government's overall aim is to ensure that patients in the UK and across the EU continue to access the best and most innovative medicines; and are assured that their safety is protected through ongoing cooperation and the strongest regulatory framework. The Government's aim is to focus on providing safe and effective regulation and facilitate collaboration on major science, research, and technology initiatives.

6. Until exit negotiations are concluded, the UK remains a full member of the EU and all the rights and obligations of EU membership remain in force. The European Union (Withdrawal) Bill will ensure that, so far as possible, the same rules and laws will apply in the UK after exit as the day before. The Bill will convert existing direct EU law such as EU regulations into UK law as it applies in the UK at the date of exit. It will also preserve the laws we have made in the UK to implement our EU obligations, such as laws already made to implement the Falsified Medicines Directive, and the Delegated Regulation being consulted on now, which will apply in UK law from 9 February 2019.

The process

7. The Delegated Regulation requires manufacturers to introduce new tamper-evident packaging on medicines and to include a unique identifier for each pack encoded within a 2D data matrix code. All manufacturers will upload the data embedded in the 2D barcode into the repositories system prior to placing the product on the market. The 2D barcode will be able to be scanned at various points of the supply chain to confirm that it is an 'authentic' medicine. On supply of the product to the patient the unique identifier must be 'decommissioned' from the repository systems. The national repository is designed to link to a central repository to allow for the authenticity of the product to be verified across Europe.
8. **Verification:** Verification can take place at any time during the movement of the medicine through the supply chain. It is a check within the repository (IT database) of the data held which ensures that the product is authentic and originates from a legitimate manufacturer.
9. **Decommissioning:** Decommissioning takes places at the end of the supply chain when the product is being supplied to the patient and changes the status of the unique identifier in the repository to indicate that the pack has been supplied– so that any other pack bearing the same unique identifier cannot successfully be verified/or decommissioned.

Article 23 organisations

10. Article 23 of the Delegated Regulation provides Member States with legal flexibility regarding their respective supply chains about where the decommissioning process should take place for persons or institutions captured under Article 23 ('Article 23 providers'). This list is made up of the following Article 23 providers;

> *(a) persons authorised or entitled to supply medicinal products to the public who do not operate within a healthcare institution or within a pharmacy;*
> *(b) veterinarians and retailers of veterinary medicinal products;*
> *(c) dental practitioners*
> *(d) optometrists and opticians;*
> *(e) paramedics and emergency medical practitioners;*
> *(f) armed forces, police and other governmental institutions maintaining stocks of medicinal products for the purposes of civil protection and disaster control;*
> *(g) universities and other higher education establishments using medicinal products for the purposes of research and education, with the exception of healthcare institutions;*
> *(h) prisons;*
> *(i) schools;*
> *(j) hospices; and*
> *(k) nursing homes*

Further definitions

11. **Unique identifiers (UI):** Every pack of prescription medicine will have to carry its own **unique identifier**, which includes a machine-readable 2D data matrix (or barcode) that meets ISO standards. This information will also appear in printed human-readable form, unless the packaging is too small to carry the information. The unique identifier will be made up of the following information [Article 4]:
    a. ***Product code***: the name, common name, pharmaceutical form, strength, pack size and pack type
    b. ***Serial number***: randomised numeric or alphanumeric sequence of up to 20 characters
    c. ***National reimbursement number***: national identifying code, if required by Member State
    d. ***Batch number***: up to 20 characters
    e. ***Expiry date***: in YYMMDD form

12. **Anti-tampering device (ATD):** Every pack must have some sort of **anti-tampering device** which allows visual identification as to whether the pack may have been tampered with since it was originally manufactured (or repacked, for parallel traded products). Neither the Directive nor the Delegated Regulation specifies the nature of the ATDs that can be used - the choice will be for the Marketing Authorisation Holder/manufacturer to determine the industry standards.

Introduction to the Impact Assessment

Note: Numbered references are endnotes referring to a specific question under consultation; lettered references are footnotes providing additional information

1. This impact assessment assesses the costs and benefits of applying the safety features policy to Article 23 providers based on information available at the time of assessment. Many of the systems and pieces of equipment required to implement the policy are still being designed at the time of assessment, therefore the figures are illustrative and should be used with caution.

2. The costs presented here represent the economic cost of the policy, not just the financial cost. This means they take account of resource requirements which may not equate to new financial spend, such as staff time for training. They should not be used as an accurate representation of the financial expenditure of each organisation affected by the policy.

3. A ‘high’ and ‘low’ estimate has been provided to illustrate the extent of the uncertainty in the figures. There has been significant engagement with industry to inform this impact assessment. Further questions will be asked during a formal consultation.

4. The medicine supply chain is very complex and various entities through the supply chain have differing legal responsibilities. To avoid unnecessary complexity this impact assessment does not seek to clarify the existing legal definitions and responsibilities for all the entities. Therefore, this impact assessment should not be used to clarify the legal basis or responsibilities for any organisation in the supply chain. This should be done by referring to the relevant legislation and guidance.

5. For ease of reference, when this impact assessment refers to “medicines”, it refers only to those in scope of the policy.

6. Questions that will be asked as part of the consultation are listed in the endnotes for ease of reference[1] - please reference the relevant questions number when responding. We would welcome consultation responses to support or challenge the analysis in this impact assessment.

Effective consultation responses tell us...

Problem under consideration

7. A falsified medicine is defined as any medicinal product with a false representation of:

    - its **identity**, including its packaging and labelling, its name or its composition as regards any of the ingredients including excipients and the strength of those ingredients;
    - its **source**, including its manufacturer, its country of manufacture, its country of origin or its marketing authorisation holder; or
    - its **history**, including the records and documents relating to the distribution channels used

8. As they have not been properly evaluated to check their quality, safety and efficacy, falsified medicines are a threat to public health. Falsified medicines may:
    - Contain ingredients of low quality or in the wrong amounts
    - Be deliberately and fraudulently mislabelled with respect to their identity or source.
    - Have falsified packaging, the wrong ingredients, or low levels or none of the active ingredients.

9. Falsified medicines present the following risks to public health:
    - Adverse reactions.
    - Dangerous ingredients.
    - Interaction with other medicines.
    - Lack of efficacy and hence no improvement in health conditions.
    - Disincentive to take prescribed medicines.
    - Loss of faith in healthcare systems.

10. Currently, there is no way to verify medicinal products at pack level as being from a legitimate source.

11. The EU Falsified Medicines Directive (FMD) seeks to prevent falsified medicines from entering the legitimate supply chain and reaching patients. Falsified medicines (the term ‘falsified’ is used to distinguish from IP violations, so-called ‘counterfeits’) are a major threat to public health and safety. FMD introduces new pan-European measures to ensure that medicines are safe and that trade in medicines is properly controlled. A number of elements of the Directive were implemented in 2013 and this impact assessment considers the final part of the package, the ‘safety features’ policy of the FMD set out in the Delegated Regulation.

12. The ‘safety features’ policy includes two mandatory changes to the outer packaging of certain medicines to allow for medicines to be verified and authenticated. It provides for (i) a unique identifier (a 2D matrix code and human readable information to allow identification) and; (ii) tamper-evident features on the pack (a seal to indicate whether the pack has been tampered with). The FMD placed

the Commission under an obligation to adopt delegated acts[a] setting out the details relating to the unique identifier. More specifically, in accordance with Article 54a(2) of Directive 2001/83/EC, the delegated act(s) shall set out:

- The characteristics and technical specifications of the unique identifier[b];
- The methods for verification of the safety features[c];
- The provisions on the establishment, management and accessibility of the repository systems in which information on the safety features is to be contained[d];
- The lists containing the medicinal products or product categories which, in the case of prescription medicines shall not bear the safety features, and in the case of non-prescription medicines shall bear the safety features[e]; and
- The procedures for the notification of medicinal products by the national competent authorities to the Commission, as regards medicinal products (not) at risk of falsification. This impact assessment considers the flexibilities around Article 23 providers in the 'safety features' policy of the Commission Delegated Regulation (EU) 2016/161[f].

13. The Medicines and Healthcare products Regulatory Agency (MHRA) seeks to transpose the 'safety features' policy in the least burdensome way with no gold-plating.

Rationale for intervention

14. Government intervention is justified as there is asymmetric information in the market, which could lead to harm to public health. Medicinal products are reaching consumers without having the information on which medicines are legitimate, and which are falsified.

Policy Objective

15. To prevent harm to people in the UK from falsified medicines.

16. To reduce the occurrence of falsified medicines in the legitimate supply chain.

Options Considered

17. **Option Zero:** Do nothing

18. **Option One:** Legislate and require wholesalers to decommission for Article 23 providers[g]

[a] The measures may be contained in one delegated act or several delegated acts. For the purpose of this document, reference is made to 'delegated act'.
[b] Article 54a(2)(a) of Directive 2001/83/EC
[c] Article 54a(2)(d) of Directive 2001/83/EC
[d] Article 54a(2)(e) of Directive 2001/83/EC
[e] Article 54a(2)(b) of Directive 2001/89/EC
[f] Article 54a(2)(c) and Article 54a(4) of Directive 2001/83/EC
[g]The 'Article 23 providers' are veterinarians and retailers of veterinary medicinal products, dental practitioners, optometrists and opticians, paramedics and emergency medical practitioners, armed forces, police and other governmental institutions maintaining stocks of medicinal

- The Regulation gives Member States the option to additionally require wholesalers to decommission for other providers. Under this option, the legal flexibility provided by the Regulation would be utilised to fit better with the UK supply chain. As an additional requirement, it will need to have a strong evidence base as to why this would be in the UK's interests, and how it fits with our policy of keeping implementation burden to a minimum.

products for the purposes of civil protection and disaster control, universities and other higher education establishments using medicinal products for the purposes of research and education, with the exceptions of healthcare institutions, prisons, schools, hospices and nursing homes.

19. **Option Two:** Legislate and require certain Article 23 providers[h] to decommission themselves. This is the default position unless the UK makes a specific legal change. The EU have provided this option to allow individual Member States to decide how dispensing for these providers would work best for their individual supply chains.

    - Under this option, the UK would not make use of this flexibility. This is the default position unless the UK makes a specific legal change. We have included Option Two to understand its costs against our preferred option so that UK can make a decision with the appropriate evidence. Medicines supply chains across Europe vary and the UK's is particularly complex. Each Member State will be taking their own decision over this flexibility and the UK decision on Article 23 must specifically reflect the UK supply chain.

Do nothing

20. The costs and benefits of the 'do nothing' option are zero, as it is the base case. Under this option those in the supply chain continue to miss information on which medicines come from a legitimate source and which do not. Under this option there is a higher risk of further harm to people in the UK from falsified medicines.

21. If the UK does nothing, whilst the EU legislates, there is a risk that all the falsified medicines that will become difficult to sell in the EU will come in to the UK's less regulated market.

Legislate

22. Implementing the 'safety features' policy will impact most the medicine supply chain.

    - Manufacturers will be required to put an anti-tampering device and a unique identifier encoded within a 2D matrix on each pack of prescription medicine.

    - Wholesalers will be required to verify medicines if these are received from another wholesaler who is not designated by the marketing authorisation holder to distribute medicines on their behalf. Wholesalers may have to decommission on behalf of certain Article 23 providers.

    - Those who supply medicines to members of the public operating in a healthcare institution or pharmacies will be required to decommission medicines and check the anti-tampering device.

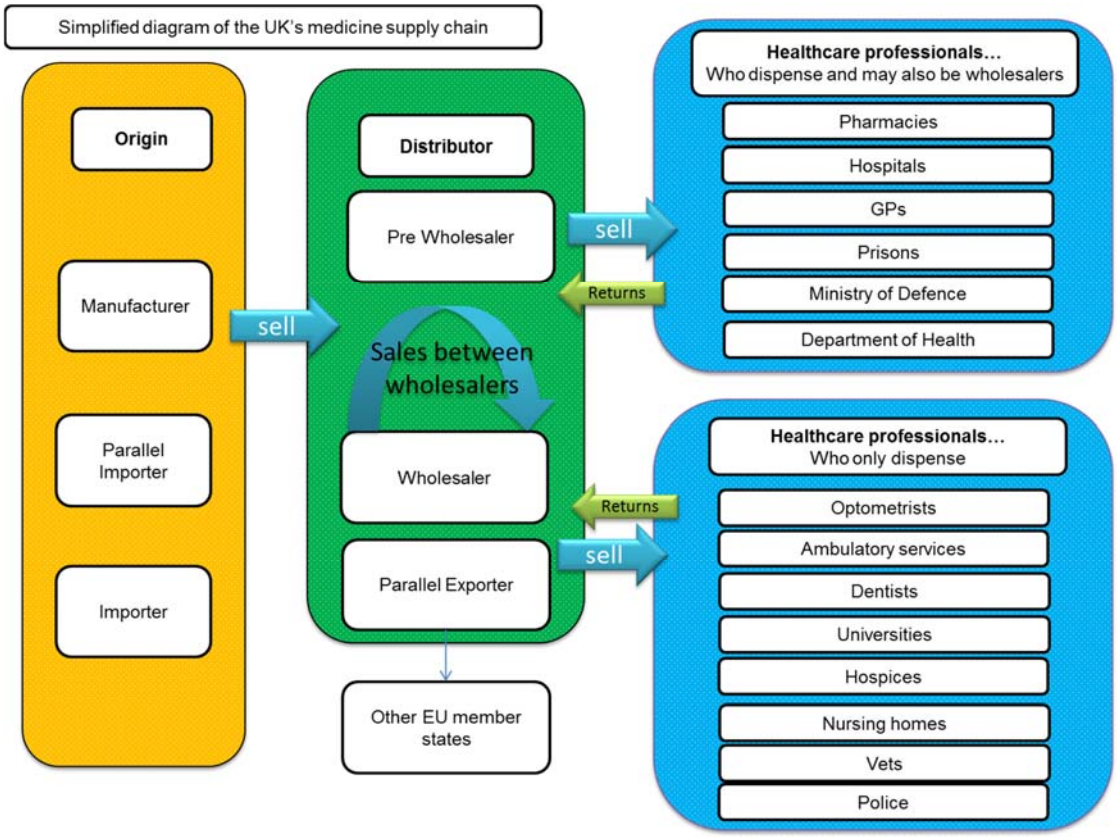
23. This impact assessment analyses the impact of the flexibility in the Falsified Medicines Directive of whether wholesalers will be required to decommission on behalf of Article 23 providers, or whether Article 23 providers will be required to decommission for themselves. In addition to Article 23, there are a small number of other flexibilities within the Regulation that have not been assessed because our overall approach is not to go beyond the minimum requirements of the Regulation.

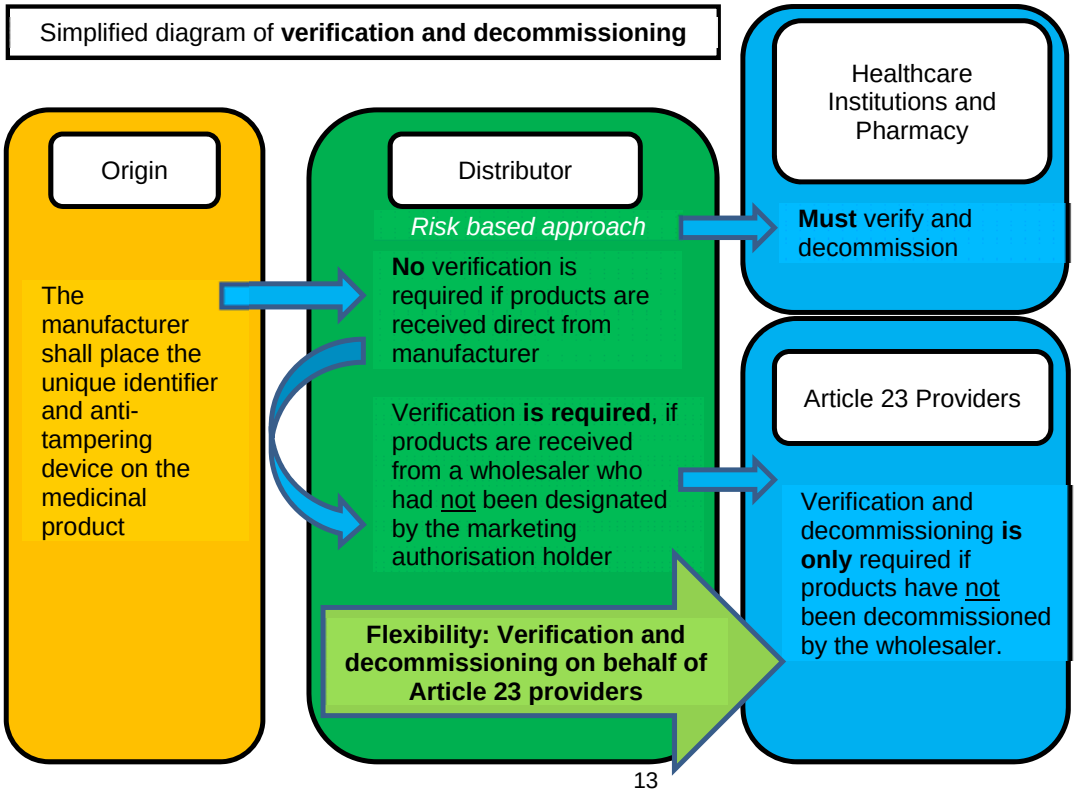
[h] This excludes healthcare institutions and pharmacies

The medicine supply chain

24. We estimate that there will be 3.1 billion prescription medicines dispensed in the UK in 2019, increasing annually by 2%. Please see Annex A for details.

25. The medicine supply chain is very complex. A simplified outline of the medicine supply chain, and where action is required, is shown below.





Benefits

26. The primary benefit of this policy is to the health of people in the UK. Falsified medicines are a public health threat to patients and the public, particularly the vulnerable, and they are often linked to organised crime. Risks include inactive ingredients, wrong dosages, and harmful substances added in the manufacturing process[i]

27. This policy will further secure the legitimate supply chain against infiltration from falsified medicines.

28. According to statistics from customs authorities in the EU, the number of medical products seized at the outer border of the EU (not counting patent issues) trebled between 2005 and 2009 to reach approximately 7.5m. Medicines accounted for 8% of all seized materials in 2014. Recent estimates suggest that global sales of counterfeit medicines are worth more than €57 billion, having doubled in just five years between 2005 and 2010.[j]

29. We have not monetised the benefits of this policy because this would be unreliable, due to the high levels of uncertainty around:

- **The number of falsified medicines in the legitimate supply chain.** There are no data on undetected falsified medicines in the legitimate supply chain, as by definition, they are undetected. There is research on the presence of counterfeit or falsified medicines; however, this evidence refers to falsified medicines traded outside the legitimate supply chain. Therefore, the existing research does not address the problem this policy is designed to solve.
- **The impact of a falsified medicine.** There are no data on which to model the impact of a falsified medicine. A falsified medicine could exacerbate the patient's current condition, or have new negative health impacts; it could have a placebo effect; it could have no effect; it could have a reduced effect. We do not have the data to translate this into a Quality Adjusted Life Year (QALY) impact.
- **The number of falsified medicines the policy will prevent.** If the UK does not adopt the 'safety features' policy whilst the rest of the EU does, the UK may become the 'weak link' of the EU, and all of the EU medicines that can no longer be easily sold into other EU markets may flow into the UK. We do not have the data to provide a plausible model of the impact of this.

30. The specific benefits of reducing the number of falsified medicines in the legitimate supply chain are:

- A reduced number of adverse reactions;
- Preventing people from not recovering due to ineffective medicine; and
- Increase the trust of the people in the UK in the healthcare system.

[i] Council of Europe fact sheet, December 2015
[j] Council of Europe fact sheet, December 2015

31. We have searched for falsified medicines data within the MHRA, Department of Health and Social Care (DHSC), and the National Institute for Health and Care Excellence, as well as reviewing the work of the World Health Organisation. Unfortunately, no data was available to inform a benefit monetisation. We would welcome any evidence to assist us in monetising the benefits at consultation[2].

32. As we cannot provide a monetised estimate of the benefit, we will first provide an illustration of how many lives the policy would need to save to break even using a prostate cancer example. Secondly, we will use the EU's estimate of the number of falsified medicines in the supply chain to perform a break-even analysis to establish how many QALY losses each falsified medicine will have to prevent to break even.

33. The European Commission's impact assessment estimates that 0.005% of medicines in the legitimate supply chain are falsified; however, we do not have the evidence to show that this is the case in the UK. Over the ten-year appraisal period we expect there to be 1.69 billion prescription items in the UK[k] dispensed by Article 23 providers. If we take the European Commission's assumption of 0.005%, this means we expect approximately 4000 falsified medicines to be dispensed by Article 23 providers in the next ten years. Taking the direct ten-year cost of the policies preferred option, £25.7 million, this means each falsified medicine item prevented would need to have caused the loss of 0.1 QALYs for this policy to break even. If the policy only prevented half of the falsified medicines from getting through, then each medicine would need to prevent the loss of 0.2 QALYs. These figures represent the QALY loss that needs to be prevented for a year. If the harm from the falsified medicine is short lived, there needs to be an increased QALY loss for the policy to break even. For example, if the harm from the falsified medicine would have lasted for two weeks, to break even the harm must have been equivalent to a 0.4 QALY loss.

34. Due to lack of data described above, we do not have the evidence to confirm whether this policy is likely to realise enough benefits to break even. This policy represents a significant cost to the UK, so significant benefits will be required to break even.

35. There will be a resource saving to business when they are required to make a product recall. Currently, both manufacturers and distributors have recall procedures, but the verification system should aid recall using the unique identifier/batch number. This will reduce the resource required for recalls, however, we have no data to monetise this. We welcome evidence on this during consultation.[3] During MHRA's stakeholder engagement, most stakeholders recognise the need for a system to secure the medicine supply chain, and support such a system being implemented. We welcome further views on this at consultation[4].

[k] See Annex A

Risks

36. There remain risks that the implementation of safety features will not fully prevent the entry in to the legal supply chain of falsified medicinal products. Safety features itself is only one part of a group of measures under FMD to help ensure patient safety. A holistic approach will continue to be necessary in the future to prevent falsified products from reaching patients. However, specific implementation concerns on safety features have been considered:

- *Entry of products into vulnerable points of the system:* Under FMD, wholesalers will only have to verify medicinal products on a risk-basis. While the option of wholesalers verifying all products (a 'track-and-trace system') was explored in the EU Commission's initial concept paper, the follow-up impact assessment discarded this an option because of the very high costs it would incur. This was supported by evidence from the EU public consultation which confirmed that stakeholders across the medicines supply chain supported a risk-based verification system rather than a 'track-and-trace' system. The UK agreed with this assessment and noted that the risk-based verification by wholesalers will help to minimise the risk of falsified medicinal products circulating undetected for lengthy periods of time.

- *Falsification of unique numbers on the IT database that would allow falsified products to appear 'genuine':* Falsification of the unique number at entry would make the system unworkable. At both a European level and national level, the organisations responsible for managing the IT repositories are putting in place measures to validate who will access the databases. The system must be designed to be highly secure and to only permit access to data under strict and defined conditions. National competent authorities have an important role in supervising the functioning of repositories.

- *Failure to decommission products, with the unique identifier subsequently being reused on falsified products:* This covers both intentional and un-intentional failure to comply. To support stakeholders in understanding their obligations there will be UK implementation guidance published complimented by other communication. Key stakeholder groups in the UK medicines supply chain will help to target messaging. In the development of policy options where there is discretion to make national decisions, the UK has sought to find solutions which provide clear obligations to all stakeholders. Compliance with the obligations of FMD will be part of regulatory inspections for each sector. In line with other regulatory provisions on medicines there are also proposed legislative changes to provide sanctions to enforce compliance.

Wholesalers

37. A wholesaler will be required to verify the unique identifier encoded with a 2D matrix code if they have purchased the medicine from another wholesaler who is not designated by the marketing authorisation holder to distribute the product on their behalf.

38. There are approximately 3500 wholesaler sites supplying prescription medicines to the UK, owned by approximately 2000 companies[l]. We estimate that 88% of packs will go through more than one wholesaler, and therefore will require verification[5m]. If you have evidence to support or challenge this assumption, please submit it as part of our consultation.

39. We estimate that the additional software for Article 23 decommissioning will cost £400-500 per wholesaler company[n6]. If you have evidence to support or challenge this assumption, please submit it as part of our consultation. Every wholesaler company will require IT software to communicate with the repository.

The additional cost to wholesalers of software			
	High Estimate	Best Estimate	Low Estimate
2019	£976k	£878k	£781k

40. We estimate that for a wholesaler, one scanner will cost between £200[o]-£750[p]. We estimate that each wholesaler site will require 5-10[q] scanners. The scanners will need to be replaced every 5 years.

The cost to wholesalers of scanners			
	High Estimate	Best Estimate	Low Estimate
2019	£25.9m	£12.3m	£3.5m
2024	£25.9m	£12.3m	£3.5m
Total ten-year cost	*£51.9m*	*£24.6m*	*£6.9m*

41. Some wholesalers have automated processes, and some have manual processes. We estimate that around 5% of wholesaler companies (100) are automated, and 95% are manual, and 92% of the volume goes through the automated wholesalers[r7]. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

l MHRA data
m Estimate provided by industry
n See manufactures section for sources
[o] EU impact assessment pg77. Exchange Rate £1 = €1.16
[p] From web search
[q] Rough estimate from visits to industry
[r] Rough estimates provided by industry

42. Under Option One wholesalers are required to decommission and check the anti-tampering device for Article 23 providers. Wholesalers would have to add in a process to flag if a medicine was for an Article 23 provider, then check the anti-tampering device and decommission each pack.

43. Under Option Two wholesalers are not required to decommission and check the anti-tampering device for Article 23 providers, therefore there are no additional costs to wholesalers.

44. If wholesalers decommission a medicine and it is returned 10 working days after decommissioning, they must destroy that medicine. MHRA policy currently requires returns to be made to wholesalers within five working days. There may be scenarios in which a medicine will not be recommissioned within 10 working days at the original site in line with the Delegated Regulation, and therefore the medicines could not be supplied to anyone else. However, in informal discussions with industry they are not expecting this to be significant, as returns are already required within five days[8]. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

45. Under Option One wholesalers must adapt their systems to alert them to when a medicine is going to an Article 23 provider. We have not been able to acquire estimates on the cost of this in addition to the cost of installing the other IT required for this policy, as the IT solutions have not been developed.[9] If you have evidence to develop this estimate, please submit it as part of your consultation response.

46. Wholesalers have said a significant cost of decommissioning for Article 23 providers is reconfiguring picking lines and paying for manual decommissioning and checking anti-tampering devices. We estimate that 5% of medicines will go to an Article 23 provider[10]. We have not split wholesalers in to 'automated' and 'manual' here, as we assume wholesalers will need to use manual labour to check the anti-tampering device, thus adding in a labour requirement[s]. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

[s] Some sites may develop an automated system which can do this.

47. We estimate that decommissioning and checking the anti-tampering device will take between 2-5 seconds per pack, at a labour cost £8.83[t] per hour. We assume this must be done for 5% of all medicine packs[u].

The cost to wholesalers of decommissioning			
	High Estimate	Best Estimate	Low Estimate
2019	£1.9m	£1.3m	£0.8m
2020	£1.9m	£1.4m	£0.8m
2021	£2.0m	£1.4m	£0.8m
2022	£2.0m	£1.4m	£0.8m
2023	£2.1m	£1.4m	£0.8m
2024	£2.1m	£1.5m	£0.8m
2025	£2.1m	£1.5m	£0.9m
2026	£2.2m	£1.5m	£0.9m
2027	£2.2m	£1.6m	£0.9m
2028	£2.3m	£1.6m	£0.9m
Total ten-year cost	*£20.8m*	*£14.6m*	*£8.3m*

48. If we assume that all automated wholesalers will need to adjust an additional picking line to cater for this option, then we estimate 5% of sites, as outlined above, must reconfigure their production lines, at a cost of £65k[v11] each. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

The cost to wholesalers of adapting picking lines for Article 23 providers			
2019	£11.5m	£11.5m	£11.5m

49. Wholesalers will be required to familiarise themselves with this new policy. We assume that one person from each wholesaler company will spend 1-1.75 hours familiarising themselves with the Article 23 aspects of the safety features policy[12]. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response. At a wage of £21.08[w] this gives the below costs:

The cost to wholesalers of familiarisation			
2019	£0.07m	£0.06m	£0.04m

[t] ASHE 2015, an average of Process, plant and machine operatives and Elementary process plant occupations median wage
u Excluding the 25m packs that were counted for parallel imports.
[v] EU impact assessment pg77. Exchange Rate £1 = €1.16
[w] ASHE 2015, an average of Production managers and directors, Functional managers and directors and Production and process engineers median wage

50. Wholesalers will be required to train staff to comply with the 'safety features' policy. If we assume 1-2 staff members at each site will require 1.75-3.5[13] hours training at a wage of £8.83[x], then the total cost of training is:

The cost to wholesalers of training			
2019	£0.21m	£0.13m	£0.05m

51. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

Article 23 providers

52. Under Option One wholesalers will decommission medicines on behalf of Article 23 providers, therefore Article 23 providers will incur no additional cost. Under Option Two Article 23 providers will be compelled to decommission themselves. This section assesses the cost of Option Two to Article 23 providers. The Article 23 providers are:

- veterinarians and retailers of veterinary medicinal products[y];
- dental practitioners[z];
- optometrists and opticians[aa];
- paramedics and emergency medical practitioners[bb];
- armed forces, police and other governmental institutions maintaining stocks of medicinal products for the purposes of civil protection and disaster control[cc];
- universities and other higher education establishments using medicinal products for the purposes of research and education, with the exceptions of healthcare institutions[dd];
- prisons[ee];
- schools[ff];
- hospices[gg]; and
- nursing homes[hh]

[x] ASHE 2015, an average of Process, plant and machine operatives and Elementary process plant occupations median wage
[y] http://www.rcvs.org.uk/find-a-vet/search/?filter-keyword=&filter-specialistices=&filter-advanced-practitioner=&filter=Search&search=true
[z] https://www.bda.org/dentists/policy-campaigns/research/workforce-finance/ddrb/Documents/state_of_general_dental_practice_november_2013.pdf
[aa] http://www.optical.org/goc/download.cfm?docid=2A36AC90-0A28-46B2-9665FAC0D6E79742
[bb] http://www.hcpc-uk.org/aboutregistration/professions/index.asp?id=10#profDetails. We assume one scanner is required four every 4-6 paramedics, based on 23,519 paramedics. One for every six is out low estimate, and one for every four is our high estimate.
[cc] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416787/48392_Cm_9045_Armed_Forces_Pay_print_ready.pdf
[dd] http://www.universitiesuk.ac.uk/facts-and-stats/Pages/higher-education-data.aspx
[ee] https://www.gov.uk/government/organisations/hm-prison-service/about, http://www.gov.scot/about/public-bodies/hmip, https://www.nidirect.gov.uk/articles/prisons-northern-ireland
[ff] http://www.gov.scot/Publications/2015/12/7925/321880, http://gov.wales/docs/statistics/2016/160727-school-census-results-2016-en.pdf, https://www.gov.uk/government/publications/number-of-schools-teachers-and-students-in-england
[gg] https://www.hospiceuk.org/media-centre/facts-and-figures
[hh] http://www.cqc.org.uk/content/care-homes, http://www.isdscotland.org/Health-Topics/Health-and-Social-Community-Care/Publications/2014-10-28/2014-10-28-CHCensus-Report.pdf, https://ipc.brookes.ac.uk/publications/PPIW_The-Care-Home-Market-in-Wales-mapping-the-sector-Oct_2015.pdf, https://www.health-ni.gov.uk/sites/default/files/publications/dhssps/cc-adults-ni-14-15.pdf

Number of sites	
veterinarians and retailers of veterinary medicinal products	4947
dental practitioners	11810
optometrists and opticians	6182
armed forces, police and other governmental institutions maintaining stocks of medicinal products for the purposes of civil protection and disaster control	231
universities and other higher education establishments using medicinal products for the purposes of research and education, with the exceptions of healthcare institutions	159
prisons	141
schools	28490
hospices	395
nursing homes	17381
paramedics and emergency medical practitioners	23519

53. We assume that 5% of all UK medicines go to Article 23 providers. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

54. We estimate that each site of each institution above will require 2-3 scanners. We assume there will be one scanner for every four paramedics (and other emergency medical practitioners). We have used a cost of £1,300 per scanner[14ii], which includes software. We assume this will be replaced every five years. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

The cost to Article 23 providers of scanners			
	High Estimate	Best Estimate	Low Estimate
2019	£279.6m	£234.3m	£189.0m
2024	£279.6m	£234.3m	£189.0m
Total ten-year cost	*£559.2m*	*£468.6m*	*£377.9m*

55. Article 23 providers will be required to train staff to comply with the 'safety features' policy, and to familiarise themselves with the policy. We assume 2-4 staff members at each site will require 2-4 hours of familiarisation and training; however, we assume that all paramedics will be trained. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

[ii] EU impact assessment

56. To establish the labour cost of decommissioning and training, we have calculated a weighted average wage based on the number of people in each profession.

Hourly wage	Hourly Wage	SOC code	Number of staff trained	Weighting
veterinarians and retailers of veterinary medicinal products	£14.89	6131+2216	14841	7.1%
dental practitioners	£18.17	6143+2215	35430	16.9%
optometrists and opticians	£16.11	3216+2214	18546	8.9%
armed forces, police and other governmental institutions maintaining stocks of medicinal products for the purposes of civil protection and disaster control	£20.79	1173	693	0.3%
universities and other higher education establishments using medicinal products for the purposes of research and education, with the exceptions of healthcare institutions	£19.43	2312	477	0.2%
prisons	£17.29	1173+3314	423	0.2%
schools	£21.79	23	85470	40.9%
hospices	£16.28	2231	1185	0.6%
nursing homes	£16.28	2231	52143	24.9%
paramedics and emergency medical practitioners	£18.00	3213	23519	11.2%
Weighted Hourly wage	**£18.76**			
Weighted Wage per second	**£0.0052**			

The cost to Article 23 providers of training and familiarisation			
2019	High Estimate	Best Estimate	Low Estimate
veterinarians and retailers of veterinary medicinal products	£1.18m	£0.66m	£0.29m
dental practitioners	£3.43m	£1.93m	£0.86m
optometrists and opticians	£1.59m	£0.90m	£0.40m
armed forces, police and other governmental institutions maintaining stocks of medicinal products for the purposes of civil protection and disaster control	£0.08m	£0.04m	£0.02m
universities and other higher education establishments using medicinal products for the purposes of research and education, with the exceptions of healthcare institutions	£0.05m	£0.03m	£0.01m
prisons	£0.04m	£0.02m	£0.01m
schools	£9.93m	£5.59m	£2.48m
hospices	£0.10m	£0.06m	£0.03m
nursing homes	£4.53m	£2.55m	£1.13m
paramedics and emergency medical practitioners	£1.69m	£1.27m	£0.85m
Total 2019	*£22.63m*	*£13.04m*	*£6.08m*

The cost to Article 23 providers of decommissioning			
	High Estimate	Best Estimate	Low Estimate
2019	£4.0m	£2.8m	£1.6m
2020	£4.1m	£2.9m	£1.6m
2021	£4.2m	£2.9m	£1.7m
2022	£4.3m	£3.0m	£1.7m
2023	£4.3m	£3.0m	£1.7m
2024	£4.4m	£3.1m	£1.8m
2025	£4.5m	£3.2m	£1.8m
2026	£4.6m	£3.2m	£1.8m
2027	£4.7m	£3.3m	£1.9m
2028	£4.8m	£3.4m	£1.9m
Total ten-year cost	*£43.9m*	*£30.7m*	*£17.6m*

57. When conducting the analysis, it became clear that Option One was much more cost-effective for the UK than Option Two. That is to say it is more cost-effective for wholesalers to decommission medicines on behalf of Article 23 providers than to compel Article 23 providers to decommission themselves[15]. As it is clear that Option One represents better value for money, further analysis of the

costs of Option Two would be disproportionate. A small proportion of the Article 23 providers are government owned. Research shows that approximately 10%[16jj] are government owned, so this is the figure we have used for our EANDCB. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

58. The sources for the data in the tables below are given in the footnotes below the list of the Article 23 providers.

Social Cost

59. DHSC estimates that every £15k of NHS spend provides an additional 1 QALY 'at the margin'; and conversely, that every £15k of additional NHS cost burden foregoes 1 QALY[kk]. DHSC further estimates the social value of 1 QALY at £60k[ll]. Health economists can then estimate the true social cost of any additional cost burden by converting the financial impact into a health impact at £15k per QALY, and then monetising those impacts at £60k per QALY. As we have assumed 10% of costs to Article 23 providers fall on government/NHS, the true social cost is estimated as follows:

The true social cost of Article 23 activity			
	High Estimate	Best Estimate	Low Estimate
The cost to Article 23 providers of scanners	£727.0m	£609.1m	£491.3m
The cost to Article 23 providers of training and familiarisation	£29.4m	£17.0m	£7.9m
The cost to Article 23 providers of decommissioning	£57.1m	£40.0m	£22.8m
Total ten-year social cost	*£813.5m*	*£666.1m*	*£522.0m*

[jj] https://www.bda.org/dentists/policy-campaigns/research/workforce-finance/ddrb/Documents/state_of_general_dental_practice_november_2013.pdf https://www.justice.gov.uk/about/hmps/contracted-out https://www.theguardian.com/commentisfree/2011/jun/01/private-care-homes-social-care

[kk] The DHSC estimate of the cost at which an additional QALY is gained or lost in the NHS is £15,000. This figure is based on a published estimate of the cost per QALY at the margin in the NHS. For further explanation see https://www.york.ac.uk/che/research/teehta/thresholds/

[ll] See p23 in https://www.gov.uk/government/publications/quantifying-health-impacts-of-government-policy

OI3O methodology

60. This is an impact assessment of a policy required by an EU directive, the recommended option has no gold plating. It is therefore out of scope of 'one in three out'.

Small and micro businesses

61. Small and micro businesses are in scope of this policy. To exclude small and micro businesses would make them the weak link of the supply chain which would:

    - pose a threat to public health, as falsified medicines would have an easy route through the supply chain; and
    - potentially damage small and micro businesses by reducing the demand for their medicines. If they are seen as the weak link, other businesses and customers may see them as an unsafe place to do business.

62. In addition to this, the EU regulation does not give us the flexibility to exclude small and micro businesses. During the consultation we welcome any evidence of the impact of this policy on small and micro businesses[17]. MHRA will endeavour to ensure communications are as clear as possible to support small and micro businesses.

Summary of options

63. Option One is the preferred option, as it represents the lowest cost option to the UK, and to business. A table of the best estimates of the costs for option A and B are shown in Annex B.

Annex A: The number of prescription medicine packs in the UK.

64. We have estimated the number of prescription medicine packets in the UK by aggregating prescriptions dispensed by various outlets. The final figures are presented in the table below.

		Total	Article 23 (2.5%)	Article 23 (5%)
Number of prescription medicines 2019	Billions	3.09	0.08	0.15
Number of prescription medicines 2020		3.15	0.08	0.16
Number of prescription medicines 2021		3.22	0.08	0.16
Number of prescription medicines 2022		3.28	0.08	0.16
Number of prescription medicines 2023		3.35	0.08	0.17
Number of prescription medicines 2024		3.41	0.09	0.17
Number of prescription medicines 2025		3.48	0.09	0.17
Number of prescription medicines 2026		3.55	0.09	0.18
Number of prescription medicines 2027		3.62	0.09	0.18
Number of prescription medicines 2028		3.70	0.09	0.19

Assumptions and limitations

65. None of these figures include private prescriptions. Industry has estimated that private prescriptions are around 3%[18] of NHS prescriptions, so we have adjusted accordingly. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

66. We have increased the figure by 2% annually to account for growth[19]. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

67. These figures will be an underestimate as they do not include prescriptions from institutions such as dentists and optometrists[20]. If you have evidence to support or challenge this assumption, please submit it as part of your consultation response.

68. For ease of presentation, if a year is split, e.g. 2015-16, it will be shown as the latter year.

69. All prescription medicines are within scope of this policy, with the exception of:

- Product categories of prescription medicines listed in annex I of the Delegated Regulation will not be in scope;
- Product categories of non-prescription medicines listed in annex II of the Delegated Regulation will be in scope; and
- Radiopharmaceuticals exempted under point (o) of Article 54 of the overarching Falsified Medicines Directive.

Both lists consider the risk of the medicinal product being falsified and the risk to health of the falsified product. It would take a disproportionate level of analysis to adjust the prescription data to account for the exceptions, when it would make a minimal difference, therefore this has not been done[mm].

[mm] http://ec.europa.eu/health/human-use/falsified_medicines/index_en.htm

Annex B: Best estimate ten-year cost summary tables

	OPTION ONE TEN YEAR TOTAL	**OPTION TWO** TEN YEAR TOTAL
The cost to parallel importers of software	£0.02m	£0.02m
The cost to parallel importers of familiarisation	£0.003m	£0.1m
The cost to parallel importers of training	£0.003m	£0.1m
The cost to parallel importers of scanners	£0.01m	£0.01m
The cost to parallel importers of decommissioning products for Article 23 providers	£0.1m	£0.0m
The cost to wholesalers of software	£0.88m	£0m
The cost to wholesalers of scanners	£0.57m	£0m
The cost to wholesalers of decommissioning	£12.4m	£0.0m
The cost to wholesalers of adapting picking lines for Article 23 providers	£11.5m	£0.0m
The cost to wholesalers of familiarisation	£0.06m	£0m
The cost to wholesalers of training	£0.13m	£0m
The cost to Article 23 providers of scanners	£0.0m	£433.6m
The cost to Article 23 providers of training and familiarisation	£0.0m	£13.0m
The cost to Article 23 providers of decommissioning	£0.0m	£26.6m

[1] **CONSULTATION QUESTIONS**

[2] Please provide evidence to assist us in monetising the benefits of this policy. This could include information on the number of falsified medicines in the supply chain or the impact they have when taken.

[3] Please provide evidence on the difference between resources a business will use during a recall without the unique identifier (i.e. now), and resources used when the unique identifier is in place.

[4] We welcome your views on the value your business places on the additional protection against falsified medicine that this policy brings.

[5] Please provide evidence on the total number of packs that will require verification at wholesaler level.

[6] Please provide evidence on the cost to wholesalers of implementing software

[7] Please provide evidence on the number of automated vs manual wholesalers, and the volumes of prescription medicines that flow through each.

[8] Please provide evidence on the volume of medicines that you expect will not be recommissioned within 10 working days at the original site in line with the Delegated Regulation due to a return, and therefore the product could not be supplied to anyone else

[9] Please provide evidence on the cost of wholesalers editing software to enable Article 23 products to be decommissioned.

[10] Please provide evidence on the volume of medicines that go to Article 23 Providers

[11] Please provide evidence on the cost to wholesalers of re-engineering and re-commissioning picking lines to enable them to decommission packs on behalf of Article 23 providers. Would these costs vary with the number of Article 23 providers who they have to commission for? For example would the cost be the same if they only had to decommission for half of the Article 23 providers as oppose to all of them?

[12] Please provide evidence on the number of staff and amount of time required for wholesalers to familiarise themselves with this new policy.

[13] Please provide evidence on the number of staff and amount of time required for wholesalers to train staff on this new policy.

[14] Please provide evidence on the cost of scanners and software for Article 23 providers.

[15] Please provide any evidence supporting or opposing the decision of whether wholesalers should decommission on behalf of article 23 providers.

[16] Please provide evidence on the proportion of Article 23 providers that are government owned.

[17] Please provide any evidence on the impact of the safety features policy on small and micro businesses.

[18] Please provide evidence on the number of private prescriptions in the UK.

[19] Please provide evidence on the prescription medicine growth rate.

[20] Please provide any evidence on prescription data from other sources.